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October 27, 2011

Subject: REPLY TO NOTICE OF NONCONFORMANCES CITED IN NRC INSPECTION REPORT NO. 99900404/2011-201 dated September 27, 2011

Westinghouse acknowledges receipt of NRC Inspection Report Number 99900404/2011-201, Notice of Nonconformance dated September 27, 2011 and the Notice of Non-Conformances: 99900404/2011-201-01, 99900404/2011-201-02, and 99900404/2011-201-03. Westinghouse takes any notice of non-conformance received from the NRC seriously and is taking appropriate actions to completely resolve these issues in a timely manner, and is committed to be in compliance with the provisions of Criterion III, "Design Control" of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocess Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities."

Westinghouse also values the results from this thorough review of the implementation of Westinghouse's processes for completing the detailed design of the AP1000 reactor and for transferring the design requirements contained in the Design Control Document (DCD) into engineering, procurement, and construction documents, as it validates the robustness of the AP1000® design control processes and quality assurance program. In consideration of NRC comments made both during the inspection and in the exit meeting, Westinghouse immediately initiated corrective actions to resolve the specific items identified in the Notice of Non-Conformances.

As requested, details of corrective actions associated with each of the non-conformances are described below.

Corrective Actions for Identified Non-Conformances

Non-Conformance 99900404/2011-201-01: The non-conformance concerns the potential for a single active failure of valve RNS-V023 to prevent the PXS system from performing its safety related function. In Figure 6.3-2 of the DCD (Sheet 2), a 10-inch line connecting the PXS system to the suction of the Normal Residual Heat Removal System (RNS) pump is shown. This connection is provided for train "B" of the PXS only. Figure 5.4-7 of the DCD indicates that this connection is accomplished through a single, normally closed (NC) isolation valve, RNS-V023.

The inspection team expressed a concern that this single valve arrangement could lead to a potential for an unanalyzed loss of coolant inventory from the RCS into the IRWST, should RNS-V023 be mispositioned or should the valve spuriously open during Mode 4 of operation where the reactor is

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shutdown but the reactor coolant system is still at pressure. The inspection team identified that power to this valve is not locked out and that control of the valve is from the PMS system. Unlike the control scheme for the Automatic Depressurization System (ADS) stage 4 valves, there is no diverse, non-software based interlock that would provide protection against a single failure from within the PMS system that could result in a spurious opening of the valve.

Paragraph 3.1.4 of Tier 2 of the DCD, "Conformance with Nuclear Regulatory Commission General Design Criteria" states, in part, the following with respect to AP1000 compliance with Criterion 35 of the General Design Criteria (GDC)–Emergency Core Cooling, "The AP1000 design provides a passive core cooling system that functions independent of ac power supplies, assuming single active failures." Contrary to the above, the team identified that a single active failure of RNS-V023 has the potential to prevent the PXS system from performing its safety related function.

WEC Corrective Action Response: Westinghouse initiated a design change proposal to address the potential for a single active failure to cause a reposition of RNS-V023. Westinghouse is in the process of implementing the design change process to finalize the appropriate design changes. The target date for the approved and archived design change is November 30, 2011.

Westinghouse is also performing an extent of condition review for all active valves to determine if the potential exists for a single active failure to result in repositioning an active valve, and to determine the consequences of the failure. If necessary, Westinghouse will take the appropriate actions to address the results of the extent of condition review. The target date for completing the extent of condition review is January 14, 2012.

Non-Conformance 99900404/2011-201-02: Contrary to the statement "inadvertent opening of these squib valves will not result in loss of reactor coolant or in draining of the in-containment refueling water storage tank" in Section 6.3.2.2.8.9 of Tier 2 of the AP1000 DCD, Westinghouse failed to establish measures to assure that the design of the check valves, piping and related components located in-between the IRWST and the Direct Vessel Injection Line appropriately considered the potentially large hydrodynamic forces that could occur due to a spurious actuation of the IRWST squib valves while the reactor is at operating pressure.

It was determined that the detailed design of the check valves, piping and related components located in-between the IRWST and the Direct Vessel Injection Line did not meet the requirements contained in the DCD. The inspection team identified that the purchase specifications and technical design requirements for these components did not account for the potentially larger hydrodynamic forces that could occur due to a spurious opening of the IRWST squib valves while the reactor is at operating pressure. While Westinghouse was able to show that an open item had been created to perform a transient analysis to quantify the subject hydrodynamic forces, the open item did not specify whether the analysis should be performed at the reduced reactor coolant system pressure that might be expected during a normal accident mitigation sequence, or at the much higher reactor coolant system pressure that might exist during an inadvertent operation of the valves at full reactor coolant system pressure. Also the team identified that Westinghouse had not developed a formal process to ensure that once completed, the transient analysis results would be appropriately transferred back into the specifications and requirements for the related components.

WEC Corrective Action Response: Although Westinghouse had already identified the need to complete an analysis of hydrodynamic loads associated with an inadvertent opening of the IRWST injection line squib valves, the details of this analysis were not yet complete at the time of the

inspection. As part of the ongoing design process, Westinghouse initiated a hydrodynamic analysis to evaluate the loads on the piping, valves, and related components associated with the inadvertent opening of the IRWST squib valves at full reactor coolant system (RCS) operating pressure (2235 psig). The target date to complete, approve and archive the analysis is December 16, 2011. The results of the analysis will be used to evaluate the integrity of the piping, and the results will be documented in a formally approved and archived calculation note. The target date for completing the analysis and evaluating the integrity of the piping is May 31, 2012.

Parallel to evaluating the integrity of the piping system, the resultant loads from the hydrodynamic analysis will be specified in an engineering and design coordination report (E&DCR), and communicated to the check valve vendor to ensure the valve can withstand the resultant loads of an inadvertent opening of the IRWST squib valves, and will not cause a loss of coolant accident. The E&DCR initiates a design change and will be incorporated into the design in a document that will be added to the package typically provided to the valve vendor. The target date for sending the documentation to the vendor and receiving a reply is February 29, 2012. In addition, a similar load reconciliation process for piping and supports will be used to ensure all piping and piping supports are qualified to the appropriate acceptance limits in the piping analysis.

Finally, Westinghouse initiated a critical issue resolution team (CIRT) to review the extent of condition associated with the incorporation of hydrodynamic loads in the AP1000 design processes. Based on the results of this review, Westinghouse will take the appropriate actions to make any recommended improvements in these design processes. Westinghouse believes processes are in place to address these loads, as evidenced by the consideration of hydrodynamic loads for other PXS valves, piping and supports, FWS valves, piping and supports, etc.; however, it is recognized that existing processes may need to be more clearly defined. The target date for completion of this review is May 31, 2012.

Non-Conformance 99900404/2011-201-03: Section 3.7.3.7.1.2, of Tier 2 of the AP1000 DCD states in part, "The total combined response to high-frequency modes (Step 3) is combined by the square root of sum of the squares method with the total combined response from lower-frequency modes (Step 1) to determine the overall structural peak responses." This information is classified in the DCD as Tier 2* information that requires approval from the NRC prior to implementing a change to the methodology.

Contrary to the above, in calculation APP-1100-S2C-002, "Response Spectrum Analysis of AP1000 Containment Internal Structures," Westinghouse used an alternate direct algebraic summation method to combine the periodic and rigid seismic responses of the containment internal structures that was different than that specified in the DCD.

WEC Corrective Action Response: Westinghouse initiated a reanalysis of the containment internal structures (CIS) overall structural peak responses to the combined forces using the square root sum of squares (SRSS) methodology. The results of the analysis will be used to revise calculations which use this analysis as input. Additionally, immediate actions were taken to assess whether the application of the SRSS methodology in this calculation would negatively impact the structural adequacy determination. The preliminary assessment indicates there will be no change in design from the application of the SRSS methodology. As noted during the inspection, Westinghouse recognized the requirement to use the SRSS methodology (e.g., in the Appendix of the calculation), but an error in judgment led us to believe a justification for the deviation from the approved methodology would permit the deviation without prior NRC approval.

Through an extent of condition review, Westinghouse determined the application of algebraic summation methodology is localized to APP-1100-S2C-002. Because of the integrated approach required for the finalization of the CIS analysis of which CA05 analysis is a part, the target date of completion for revising calculations related to the seismic analysis and CA05 wall design is July 31, 2012.

Westinghouse believes there is a misunderstanding concerning Non-Conformance 9990404/2011-201-03. In the description of the non-conformance, DCD Section 3.7.3.7.1.2 is assumed to be the governing section for seismic system analysis of containment internal structures. However, containment internal structures seismic analysis is governed by DCD Section 3.7.2, including all subsections, as well as Section 3G. Nonetheless, Westinghouse committed to combining forces via SRSS in DCD Section 3G.4.3.1. Therefore, deviating from the SRSS methodology represents a deviation from the DCD, although the commitment in Section 3.7.2 and 3G are not Tier 2*. As such, Westinghouse failed to conform to a Tier 2 commitment, not a Tier 2* commitment.

Miscellaneous

Westinghouse would like to provide clarification for another statement contained in the inspection report. Based on technical discussions during the inspection, the NRC appears to have the understanding that SNERDI is performing no safety-related design work that is applicable to domestic plants. However, per Purchase Order 4500238372, SNERDI is performing safety-related work applicable to the standard plant, which included domestic plants.

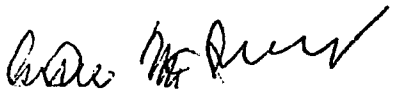
Westinghouse continues to work toward completion of open items identified during the EDV Inspection. Additionally, Westinghouse plans to have an open dialogue with the NRC on those open items of interest to ensure a mutually acceptable resolution is achieved in a timely manner.

Conclusion

Westinghouse considers this response as objective evidence providing sufficient information regarding corrective actions to satisfactorily resolve the subject Notice of Nonconformance.

Any additional questions related to this response should be addressed to John McInerney, Vice President, U.S. Engineering, Westinghouse Electric Company LLC, 1000 Westinghouse Drive, Suite 115, Cranberry Township, Pennsylvania 16066.

Very truly yours,



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cc: J. Peralta - U.S. NRC
J. Jacobson - U.S. NRC